



SIEMENS PS2

INSTALLATION AND F.A.Q.'s sliding stem and rotary applications



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OLD LINEAR MOUNTING INSTRUCTIONS

Tools Required:

- Wrenches (5/16", 3/8", 7/16", 1/2" 9/16", 10 mm, and 13mm)
- Slotted Screwdriver
- Phillips Screwdriver
- Terminating Screwdriver
- Hex Wrench Set

For linear valves, mount all hardware as shown in *Figure 1*.

To determine which holes on the *mounting bracket* to use, refer to Figures 2 & 3 and Table 2 or follow these steps:

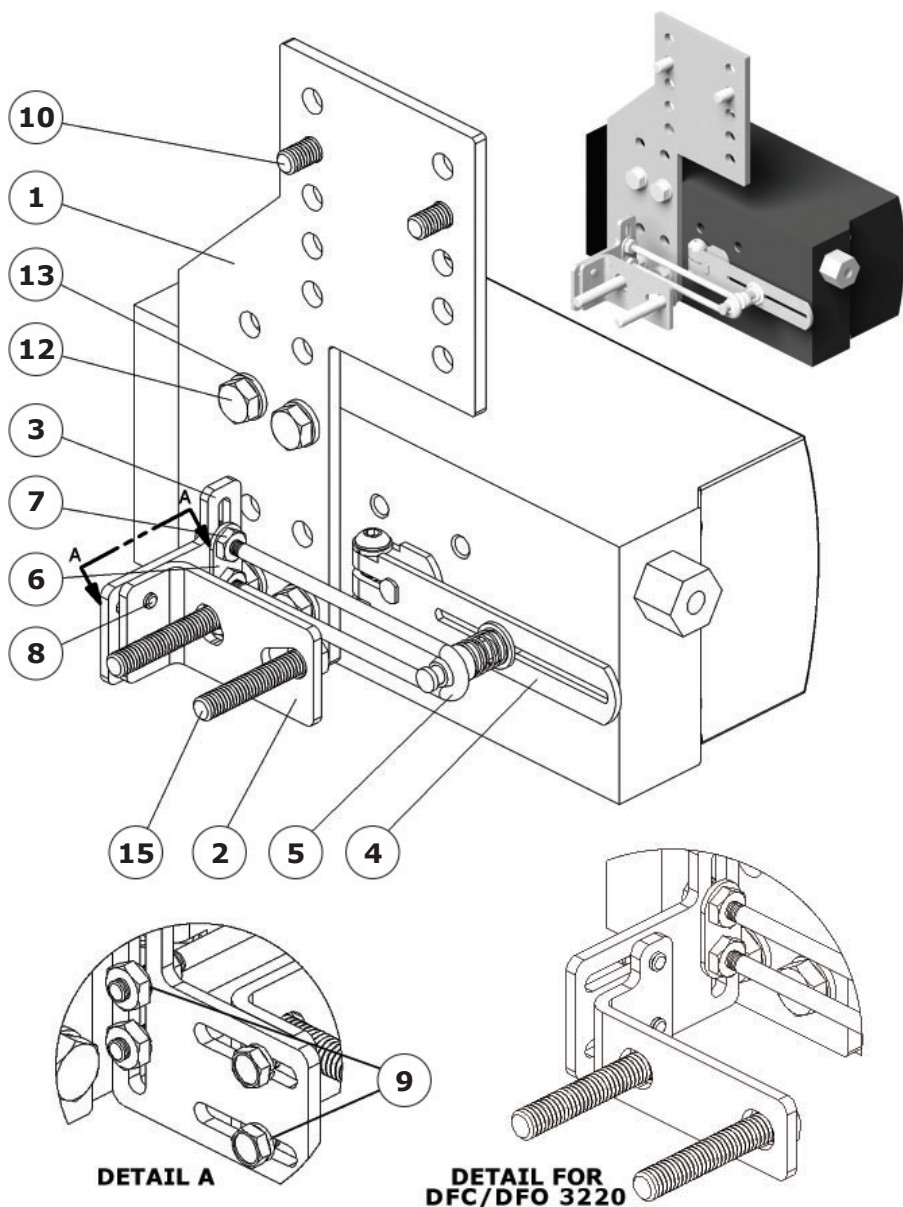
- 1** Set the actuator at half travel.
- 2** Align the feedback loop (Key 5) and feedback arm (Key 4) so that they are both horizontal, as shown in Figure 1.
- 3** The feedback loop (Key 5) should be compressing the spring on the feedback arm assembly (Key 4) anywhere between 1/4" and 1/2".

NOTE: In order to achieve proper spring compression it may be necessary to flip the mounting bracket - connecting block (Key 2).

- 4** Depending on the actuator type, size, and travel, a different combination of holes on the mounting bracket will have to be used for each application. The top 5 rows of holes are used to mount to the actuator. The bottom 4 rows are used to mount to the positioner. Choose the combination that best allows the feedback arm (Key 4), and the feedback loop (Key 5) to be horizontal and parallel at half travel.
- 5** Once this arrangement is set, tighten all the fasteners.
- 6** Follow start-up as described in this handbook or in the Chapter on "Commissioning" of the Siemens SIPART PS2 Operating Instructions (Latest Edition).

OLD LINEAR MOUNTING INSTRUCTIONS

Figure 1 *Linear Hardware Mounting Diagram*



OLD LINEAR MOUNTING INSTRUCTIONS

Table 1		
Linear Actuator Mounting Parts List		
Key	Description	Quantity
1	Bracket, Yoke - Sliding Stem	1
2	Mounting Bracket - Connecting Block	1
3	Adjusting Bracket - Feedback Loop	1
4	Feedback Arm Assembly	1
5	Feedback Loop	1
6	Washer - Feedback Loop	1
7	Hex Nut	4
8	Hex Cap Screw, Adjusting Bracket - Mounting	2
9	Lock-washer	4
10	Hex Cap Screw, Mounting Bracket - Positioner	2
11	Lock-washer, Mounting Bracket - Yoke (Not Shown)	2
12	Hex Cap Screw, Mounting Bracket - Positioner	4
13	Lock-washer, Mounting Bracket - Positioner	4
14	Airset Mounting Screw (Not Shown)	2
15	Hex Cap Screw - Connecting Block (Not Included - Use Existing Cap Screws)	2
16	Airset Regulator (Not Shown)	1
17	Spacer, Mounting Bracket - Yoke (Not Shown - Sizes 1046, 1069, & 2069 Only)	2
For Mounting Instructions refer to Pages 2, 7, & 11.		

OLD LINEAR MOUNTING INSTRUCTIONS

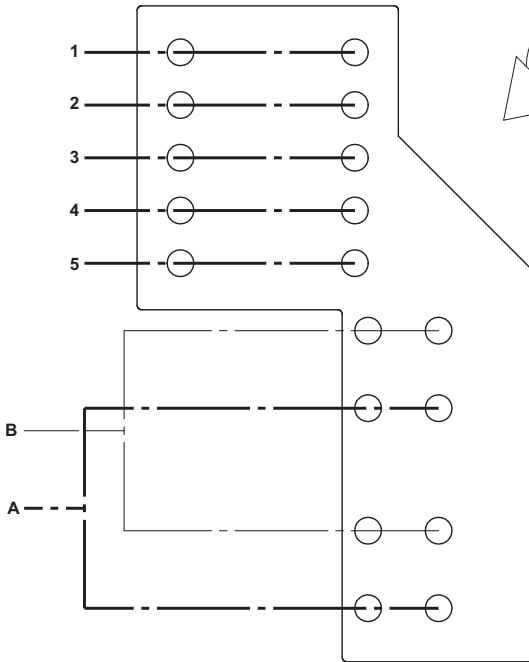


Figure 2
*Mounting Bracket
Mounting Hole Diagram*

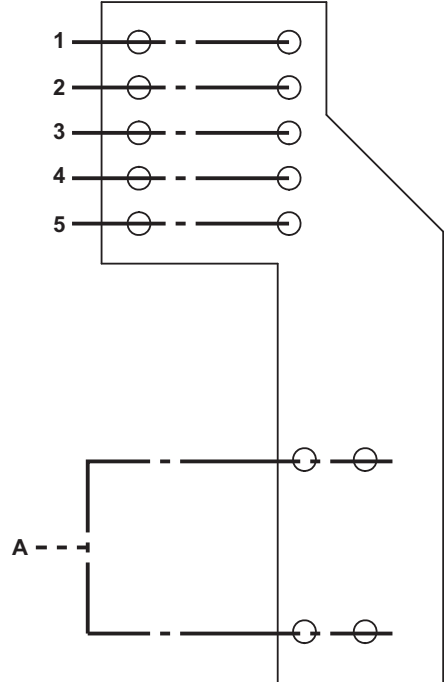


Figure 3
*Mounting Bracket
DFO Size 3220
Mounting Hole Diagram*

OLD LINEAR MOUNTING INSTRUCTIONS

Table 2

Actuator Mounting Bracket Mounting Hole Location Chart

ACTUATOR SIZE	TRAVEL	HOLE PATTERN	ACTUATOR SIZE	TRAVEL	HOLE PATTERN
DFC 1046	3/4"	5-B	DFO 1046	3/4"	5-A
DFC 1069	3/4"	4-A	DFO 1069	3/4"	4-A
	1-1/8"	4-A		1"	4-A
DFC 2069	3/4"	5-A	DFO 2069	3/4"	4-A
	1-1/8"	5-A		1-1/8"	4-A
	1-1/2"	5-A		1-1/2"	3-A
DFC 2105 DFC 2156	3/4"	1-A	DFO 2105 DFO 2156	3/4"	3-A
	1-1/8"	1-A		1-1/8"	3-A
	1-1/2"	1-A		1-1/2"	3-A
	2"	2-A		2"	2-A
DFC 3105 DFC 3156	3/4"	2-A	DFO 3105 DFO 3156	3/4"	3-A
	1-1/8"	2-A		1-1/8"	3-A
	1-1/2"	3-A		1-1/2"	3-A
	2"	3-A		2"	2-A
DFC 3220	3/4"	2-A	DFO 3220	3/4"	4-A
	1-1/8"	2-A		1-1/8"	4-A
	1-1/2"	2-A		1-1/2"	4-A
	2"	3-A		2"	4-A
	3"	2-A		3"	4-A
DFC 3220-4	2"	4-A	DFO 3220-4	2"	NA*
	2-1/2"	4-A		2-1/2"	NA*
	3"	4-A		3"	5-A
	4"	4-A		4"	NA*
NOTES:	NA = Not available at this time.				

NEW LINEAR MOUNTING INSTRUCTIONS

Tools Required:

- Wrenches (5/16", 3/8", 7/16", 1/2" 9/16", 10 mm, and 13mm)
- Slotted Screwdriver
- Terminating Screwdriver
- Hex Wrench Set

BEFORE CONNECTING THE ACTUATOR AND VALVE STEM:

- 1 Attach the sliding pin assembly (Keys 2, 3, 4, 5, 6, & 7) to the connecting block bracket (Key 1), refer to Figure 4B for assembly details. Center the sliding pin assembly in the connecting block pin slot as shown in Figure 4A. Hand tighten the hex nut (Key 7).
- 2 Using lock washers (Key 9) and cap screws (Key 10), mount the yoke bracket (Key 8) to the Siemens PS2 Positioner as shown in Figure 4C. **NOTE:** Travel markings are engraved on the front of the yoke bracket. Travel markings should be visible when mounting the PS2 to the actuator yoke, as such when looking at the cover of the PS2 housing you should be able to see the travel markings.
- 3 Connect the feedback arm assembly (Key 11) on to the shaft of the PS2 positioner using the socket set screw (Key 12). Refer to Figure 4D.

SIEMENS PS2 LINEAR MOUNTING INSTRUCTIONS:

NOTE: Refer to the appropriate valve and actuator instruction manuals for actuator mounting instructions. These instructions assume that the actuator has already been mounted to the valve but that the connecting block has yet to be installed. The threads of the valve and actuator stems should each engage the threads of the connecting block (Key 16) by a distance equal to that of the diameter of the corresponding stem or greater.

- 1 Set the actuator to the upper bench set. Move the valve stem the required travel, the valve stem should engage the actuator stem.
- 2 Place the connecting block on to the valve/actuator stems and align the connecting block (Key 16) with the window of the actuator yoke. **NOTE:** The connecting block should be parallel with the lower mounting pad of the actuator yoke. Refer to Figure 5A.

Install any spacers (Key 19), connecting block bracket (Key 1), washers (Key 18), and cap screws (Key 17) as shown in Figure 5B. **NOTE:** The cap screws (Key 17) should be centered in the connecting block mounting bracket. The sliding pin assembly and sliding pin slot of the connecting block bracket should be on the right hand side of the actuator. Refer to Table 3 for actuator sizes that require connecting block spacers (Key 19).

NEW LINEAR MOUNTING INSTRUCTIONS

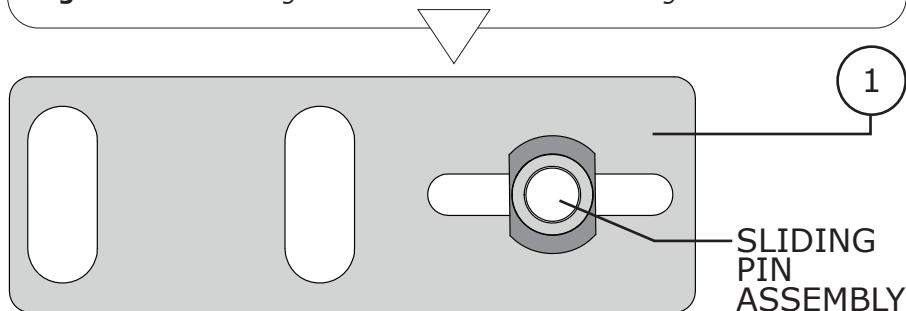
SIEMENS PS2 LINEAR MOUNTING INSTRUCTIONS (Continued):

- 3** Determine the required travel for your valve assembly and locate the corresponding mounting holes on the yoke bracket (Key 8), refer to Figure 4C for example. Attach the yoke bracket/PS2 positioner assembly to the lower mounting pad of the actuator yoke with lock washers (Key 14), cap screws (Key 13), and spacers (Key 15) if required (refer to Table 1 to determine if spacers are required). **NOTE:** Before tightening the mounting cap screws, ensure that the sliding pin assembly is aligned in the feedback arm slot as shown in Figure 5B.
- 4** Adjust the hex nut (Key 7) on the sliding pin assembly to achieve 1/16" to 1/4" compression on the spring (Key 4), refer to Figure 5B.
- 5** Set the actuator to 50% travel, the feedback arm (Key 11) should be horizontal. If the feedback arm is not horizontal, adjust the connecting block bracket (Key 1) up or down as necessary.
- 6** Place the actuator in the fully open or closed position. Adjust the sliding pin assembly left or right in the pin slot of the connecting bracket (Key 1) to achieve the correct angle of travel:

For 3/4" & 1-1/8" Travel: The feedback arm (Key 11) should be at 33° as shown in Figure 6. Adjust the sliding pin assembly until the center of the feedback arm slot aligns with the 3/16" hole of the yoke bracket (Key 8).

For 1-1/2" to 4" Travel: The feedback arm (Key 11) should be at 45° as shown in Figure 6. Adjust the sliding pin assembly until the center of the feedback arm slot aligns with the hex nuts (Key 10) in the mounting yoke bracket (Key 8) where it connects to the PS2.
- 7** Follow the START-UP instructions described in this handbook or in the Chapter on "Commissioning" of the Siemens SIPART PS2 from the Operating Instructions (Latest Edition).

Figure 4A *Sliding Pin Placement Connecting Block Bracket*



NEW LINEAR MOUNTING INSTRUCTIONS

Figure 4B *Sliding Pin Assembly Diagram*

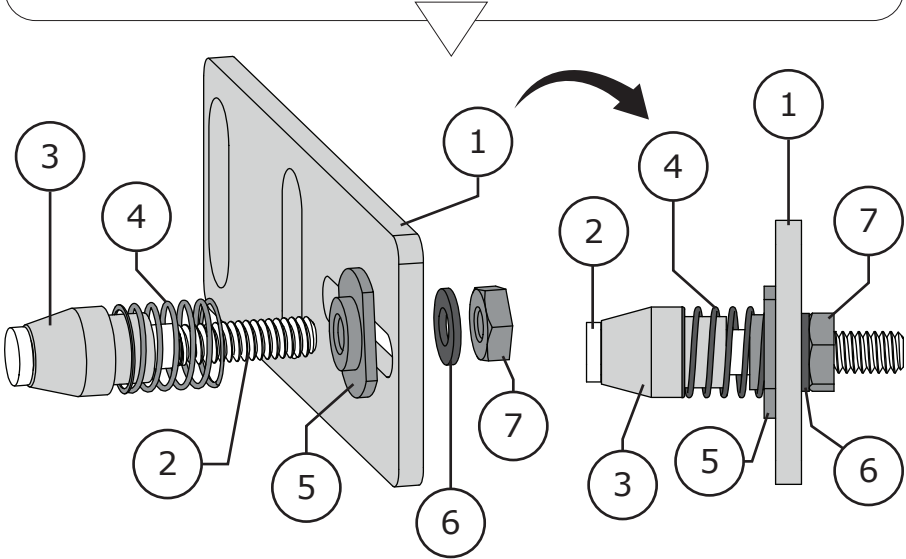
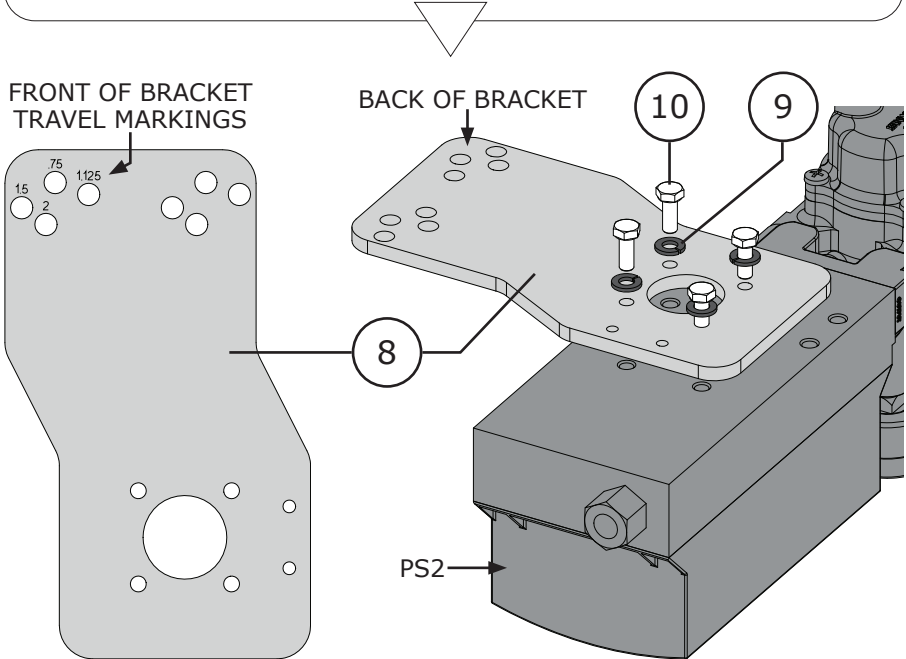
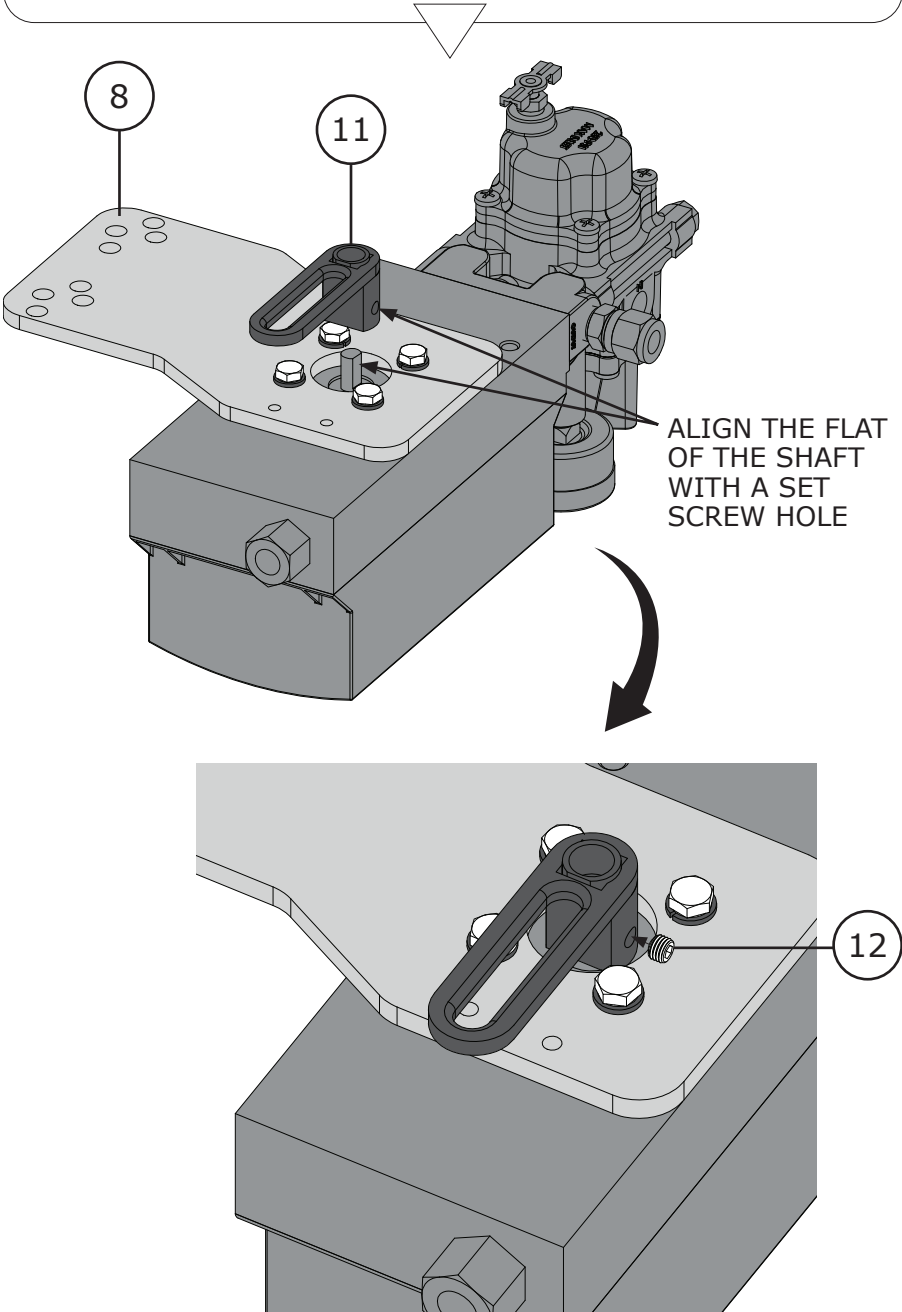


Figure 4C *Yoke Bracket Mounting*



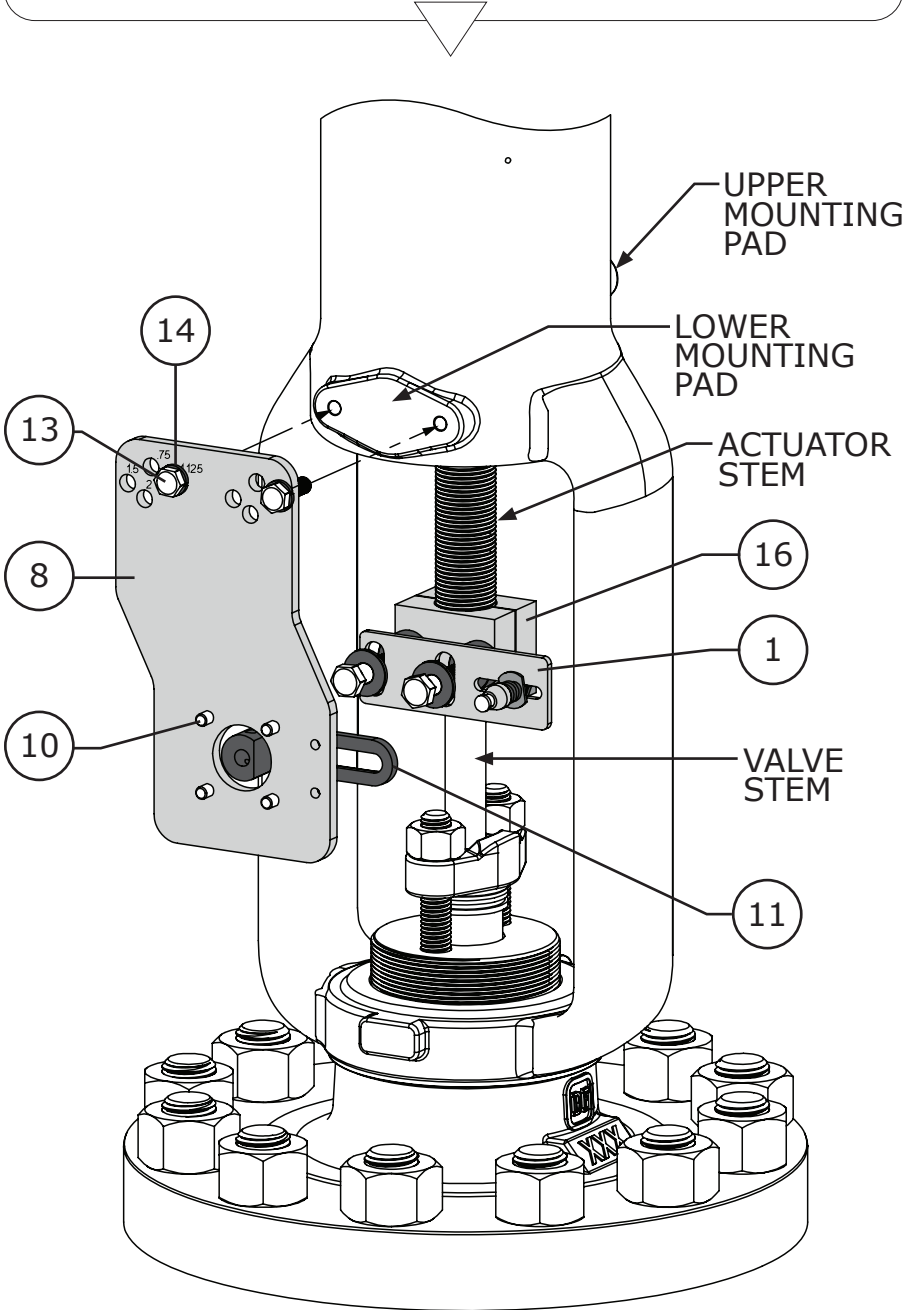
NEW LINEAR MOUNTING INSTRUCTIONS

Figure 4D *Feedback Arm Installation Diagram*

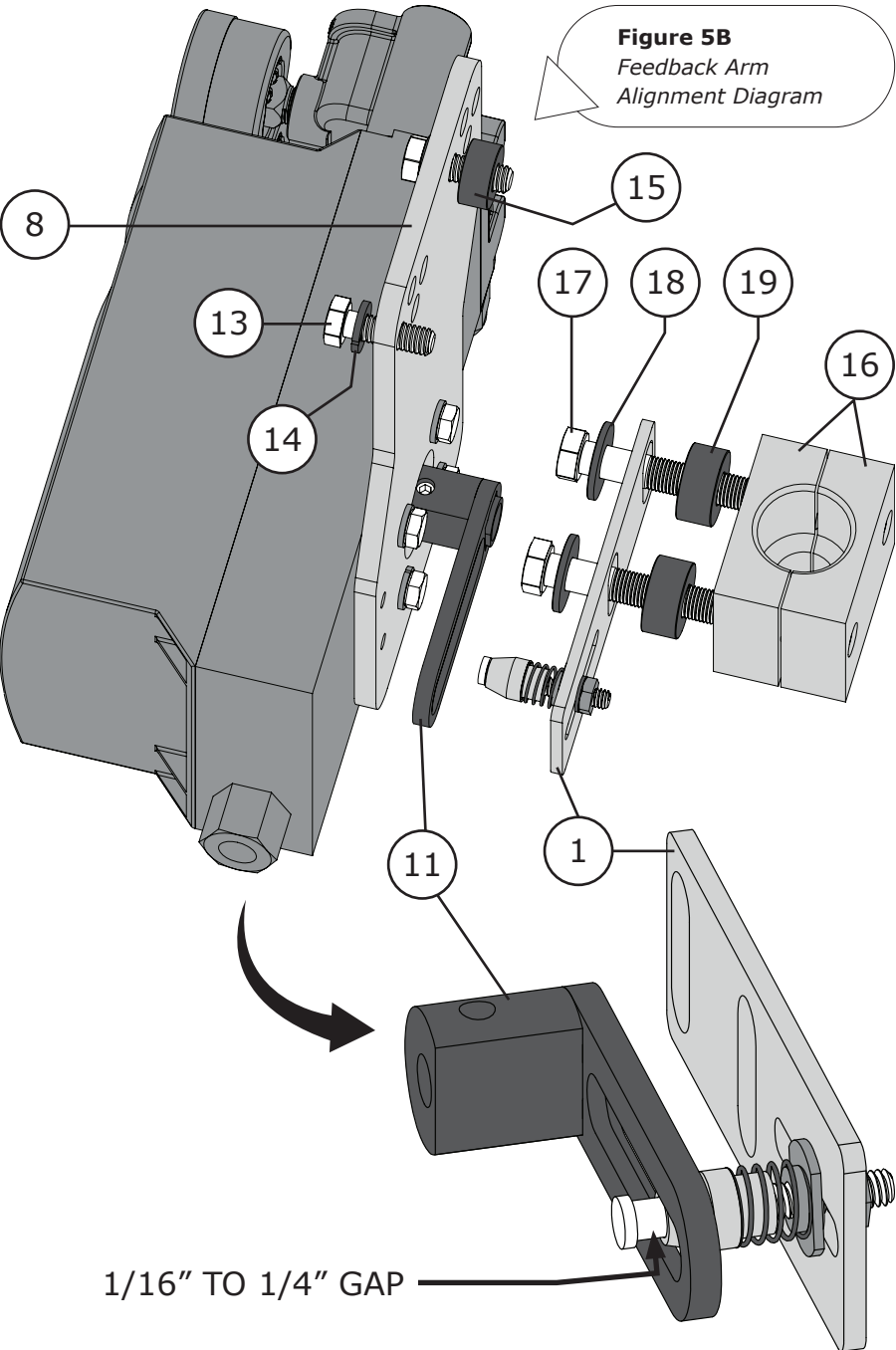


NEW LINEAR MOUNTING INSTRUCTIONS

Figure 5A *Bracket Mounting Orientation View*



NEW LINEAR MOUNTING INSTRUCTIONS



NEW LINEAR MOUNTING INSTRUCTIONS

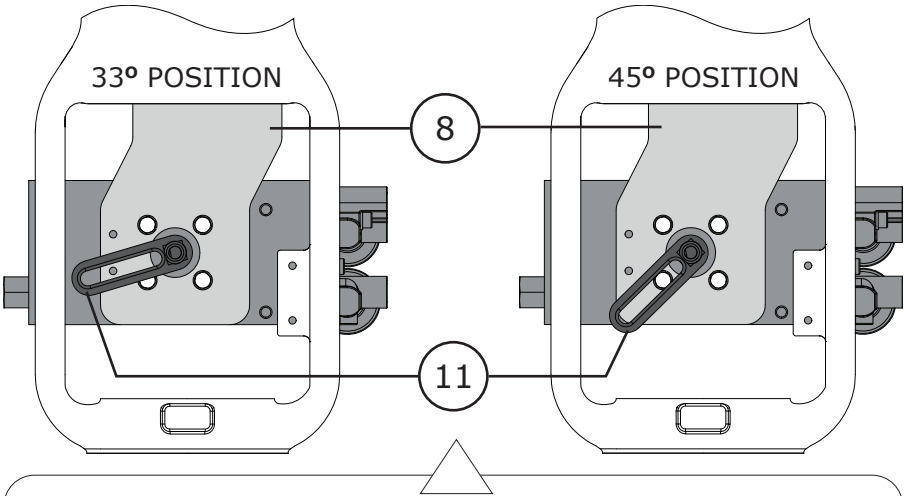


Figure 6 Angle of Travel Feedback Arm Positions - Step 6

Table 3		
Linear Actuator Mounting Parts List		
Key	Description	Quantity
1	Connecting Block Bracket	1
2	Sliding Pin - Sliding Pin Assembly	1
3	Teflon Stopper - Sliding Pin Assembly	1
4	Spring - Sliding Pin Assembly	1
5	Spring Seat - Sliding Pin Assembly	1
6	Washer - Sliding Pin Assembly	1
7	Hex Nut - Sliding Pin Assembly	1
8	Yoke Bracket	1
9	Lock Washer - PS2 Mounting	4
10	Hex Head Cap Screw - PS2 Mounting	4
11	Feedback Arm Assembly	1
12	Socket Set Screw	2
13	Hex Head Cap Screw - Yoke Bracket Mounting	2
14	Lock Washer - Yoke Bracket Mounting	2
15	Spacers - Yoke Bracket - For Actuator Size 1046	2
16	Connecting Block	1
17	Hex Head Cap Screw - Connecting Block	2
18	Washer - Connecting Block	2
19	Spacer - Connecting Block - For Actuator Sizes 2105 to 3156	2

ROTARY MOUNTING INSTRUCTIONS

Tools Required:

- Wrenches (5/16", 3/8", and 10 mm)
- Slotted Screwdriver
- Phillips Screwdriver
- Terminating Screwdriver
- Hex Bit (included with mounting kit)

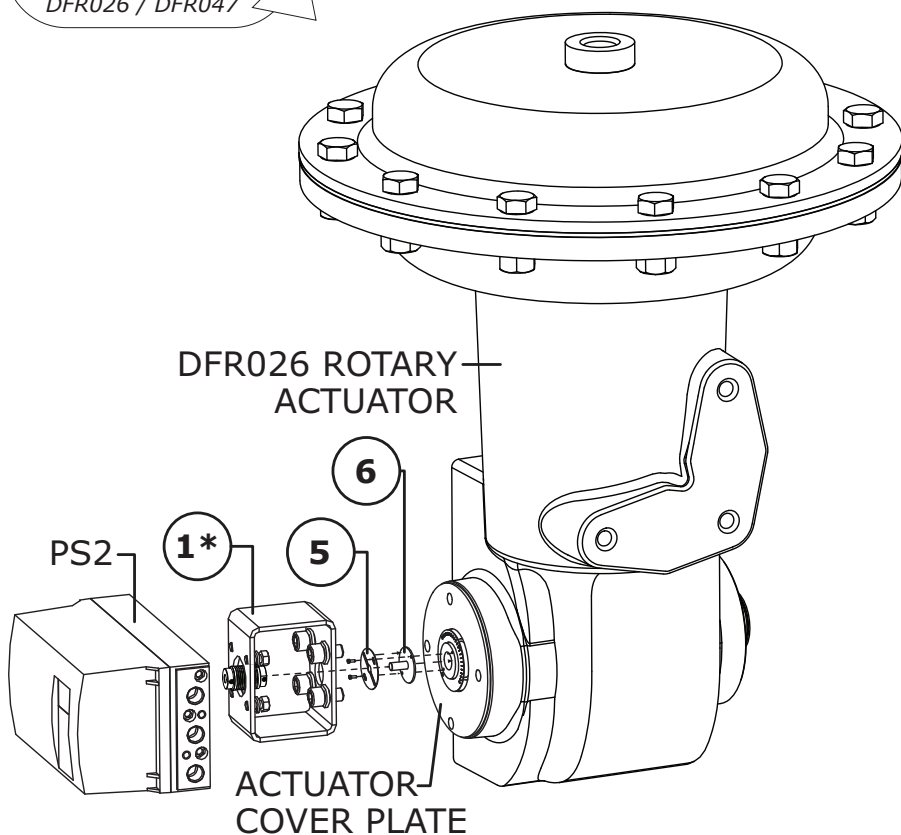
For Rotary Valves mount all hardware as shown in Figures 7 - 8.

Mounting Parts listed in Table 4. To mount a Siemens PS2 to a Rotary Actuator, follow these steps:

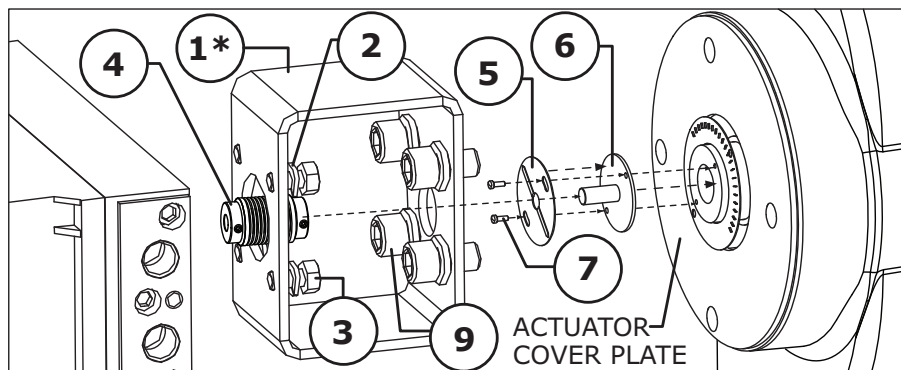
- 1** Remove the old machine screws (Key 7), old travel indicator (Key 5), and two hex cap screws (Key 8) from the actuator cover plate (Key 12).
- 2** Place the valve/actuator in the closed position. Set the travel indicator (Key 5) over the pin of the pin assembly (Key 6) and place them both onto the actuator hub. Align the travel indicator with the closed position of the actuator, thread in the travel indicator screws; completely tighten the travel indicator and pin assembly to the actuator hub while maintaining the alignment of the indicator with the closed position of the actuator.
- 3** Align the mounting bracket (Key 1) to the back of the Siemens positioner so that the four screw holes match the holes on the positioner as described in Figures 7 or 7A. Install the lock-washers (Key 2) and cap screws (Key 3) and completely tighten the bracket to the positioner.
- 4** Slide the coupler (Key 4) onto the input shaft (Key 13) of the positioner, the flat of the PS2 input shaft does not matter to the orientation of the coupler. Hand tighten the coupler screw (Key 4A) using the supplied hex bit (Key H). Do not over torque the coupler screw, torque screw to 20 lbf-in.
- 5** Place the spacers (Key 11) over the holes on the actuator cover plate. Place the PS2/mounting bracket assembly onto the actuator being careful to have the coupler fit over the pin assembly (Refer to Figure 8). Slide the two lock-washers (Key 10) onto the mounting cap screws (Key 13). Insert the cap screws through the bracket (Key 1) and spacers (Key 11) and into the actuator cover plate holes. Completely tighten the cap screws and then completely tighten the 2nd coupler screw (Key 4A) securing it to the pin assembly.
- 6** Follow start-up as described in this handbook or in the Chapter on "Commissioning" of the Siemens SIPART PS2 Operating Instructions (Latest Edition).

ROTARY MOUNTING INSTRUCTIONS

Figure 7
Basic Rotary
Mounting Diagram
DFR026 / DFR047

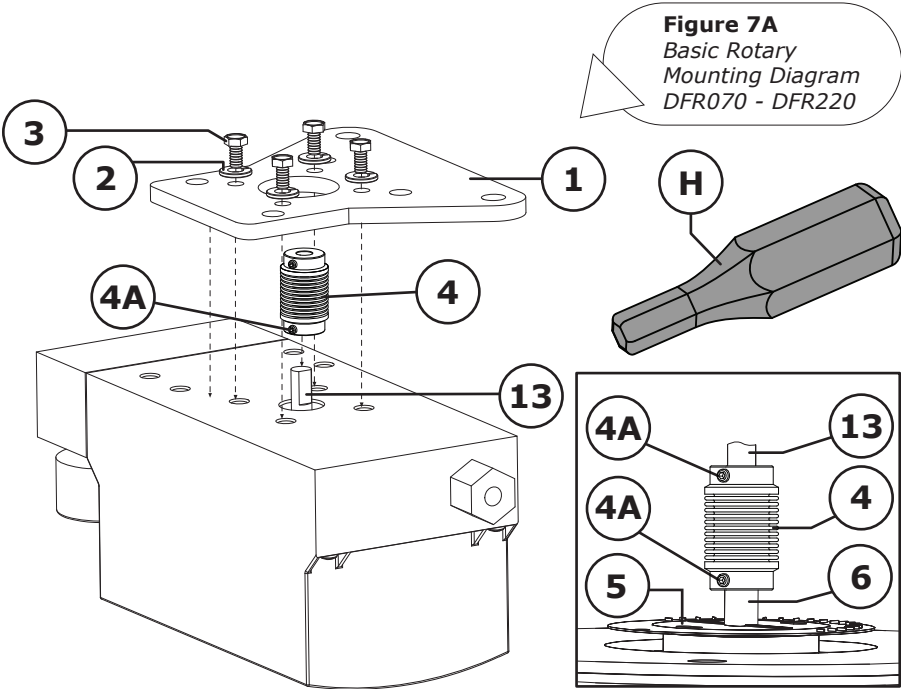


***NOTE:** The rotary mounting bracket (Key 1) is shown rotated 90° for clarity.

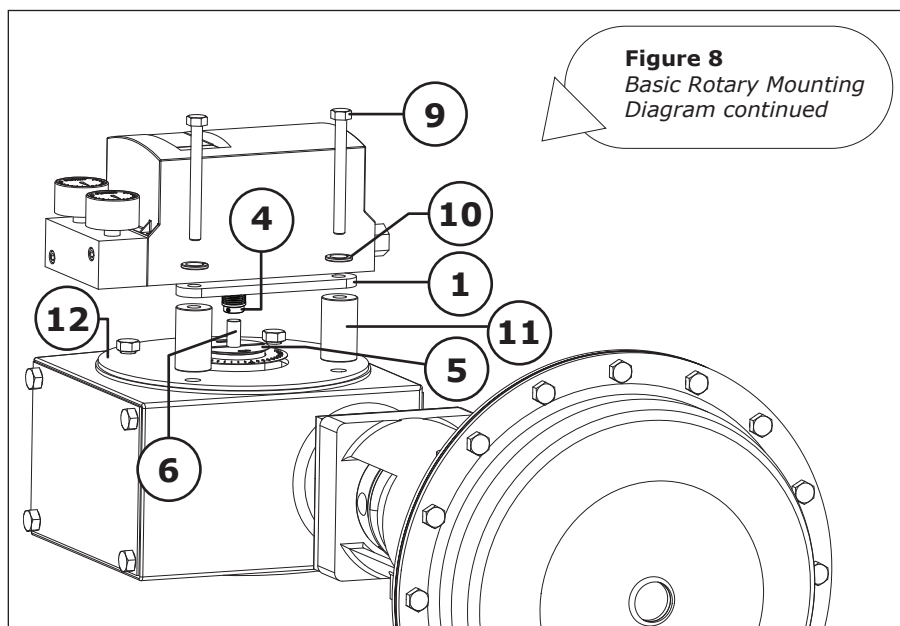
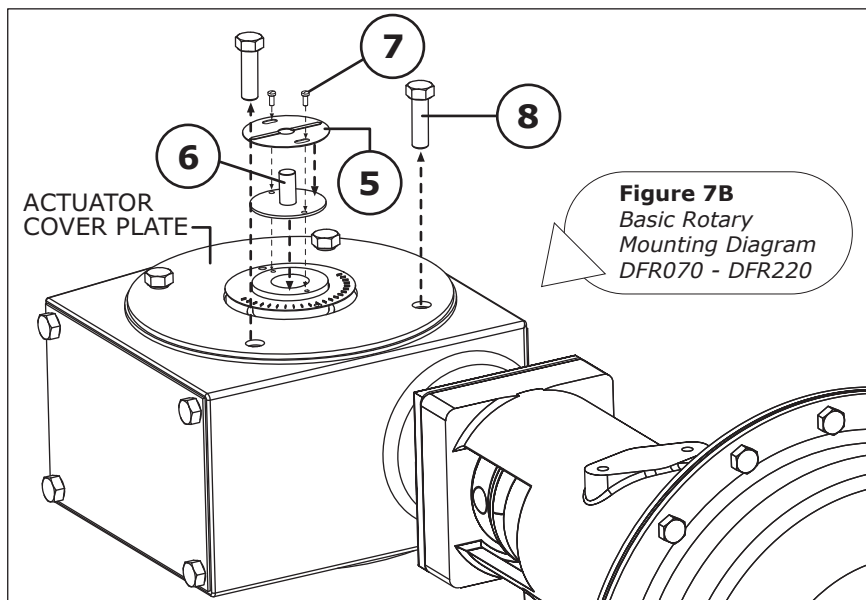


ROTARY MOUNTING INSTRUCTIONS

Table 4		
Rotary Actuator Mounting Parts List		
Key	Description	Quantity
1	Mounting Bracket - Rotary	1
2	Lock-washer	4
3	Hex Cap Screw	4
4	Coupler	1
5	Travel Indicator	1
6	Pin Assembly	1
9	Hex Cap Mounting Bolt	2
10	Lock-washer	2
11	Spacer	2



ROTARY MOUNTING INSTRUCTIONS



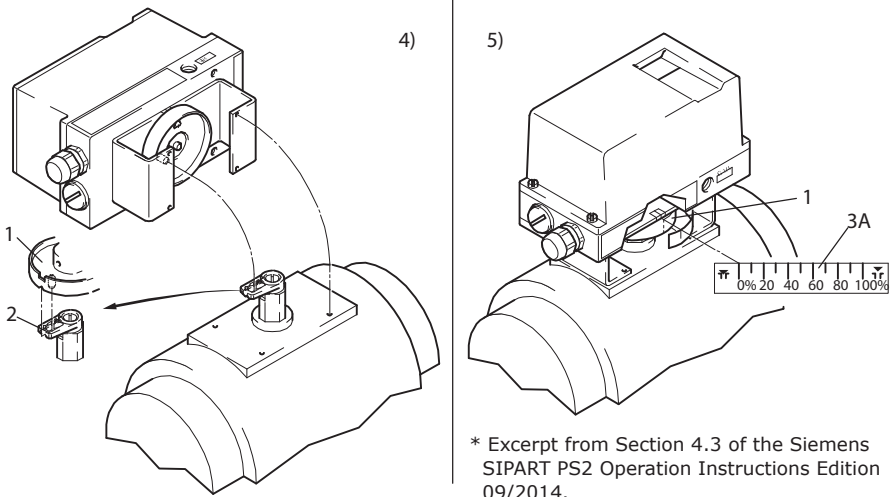
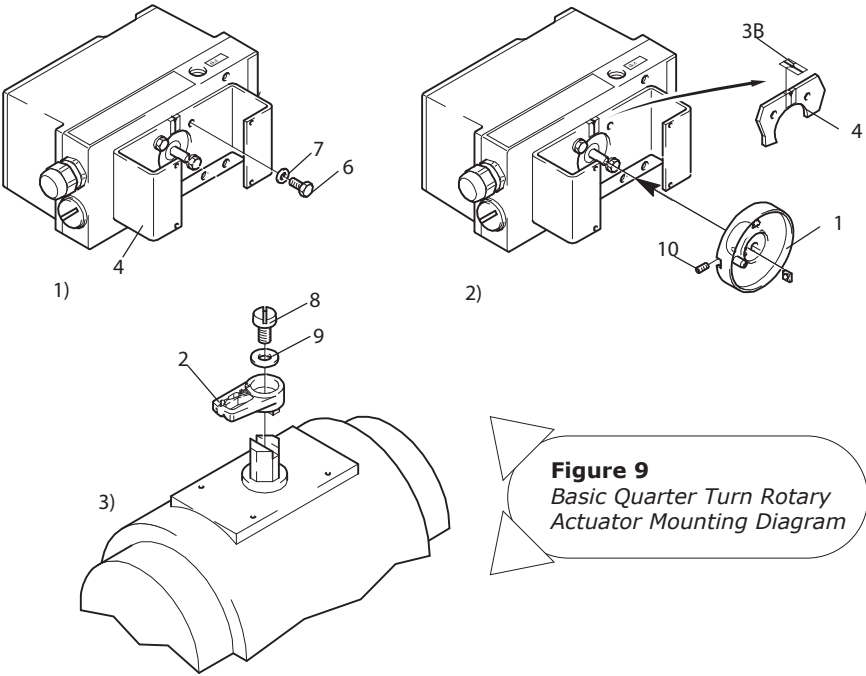
QUARTER TURN MOUNTING INSTRUCTIONS

Mount all hardware as shown in Figure 9. Quarter Turn Actuator Mounting Parts List is on Table 5. To mount a Siemens PS2 to an Quarter Turn Actuator, follow these steps:

- 1 Adhere indicator sticker (Key 3B) onto the mounting bracket (Key 4) in the center of the centering hole (Refer to Figure 9.2).
- 2 Attach the mounting bracket (Key 4) (actuator specific) onto the rear of the positioner and secure using lock-washers (Key 7) and hex cap screws (Key 6).
- 3 Push the coupling wheel (Key 1) onto the input shaft, pull it back by about 1 mm and tighten the hex socket cap screw (Key 10) with the appropriate hex key.
- 4 Place the carrier (Key 2) onto the end of the actuator and secure it using a washer (Key 9) and Fillister head screw (Key 8).
- 5 Carefully place the positioner with the mounting bracket onto the actuator such that the pin of the coupling wheel engages in the driver.
- 6 Align the positioner/mounting bracket assembly in the center of the actuator and screw tight.
- 7 Follow start-up as described in this handbook or in the Chapter on “commissioning” of the Siemens SIPART PS2 Operating Instructions Latest Edition. Drive the actuator to the end position and adhere scale (Key 3A) on the coupling wheel (Key 1) according to direction of rotation and rotary actuator.

Table 5	
Basic Quarter Turn Rotary Actuator Mounting Parts List	
Key	Description
1	Coupling Wheel
2	Carrier
3A	Scale
3B	Indicator Sticker
4	Mounting Bracket
6	Hex Cap Screw
7	Lock-washer
8	Fillister Head Screw
9	Washer
10	Hex Socket Cap Screw

QUARTER TURN MOUNTING INSTRUCTIONS

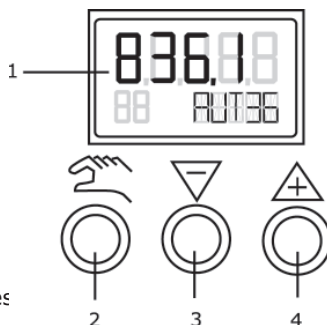


SIEMENS OVERVIEW

FOR FACTORY MOUNTED PS2'S

The Siemens Digital Positioner is extremely easy to use and configure with onboard programming and a display window. The positioner is HART protocol standard. Can be purchased with Profibus PA or Foundation Fieldbus communication protocols.

Figure 10 *Display Window*



Display Window

- 1 The display window (Figure 10) has two lines
 - The top line is the % open or closed.
 - The bottom line tells you if the unit is in *manual* or *automatic mode* (AUT or MAN).
 - The bottom line also displays the *input control* % of the 4-20 mA supply.

Operation Keys

When the cover is removed, there are three buttons on the front of the Siemens PS2 Positioner that provide all the tools needed to set up the positioner (Figure 10). The Class I Zone I Explosion Proof version has the buttons under an access door that needs to be unscrewed and opened. It is located under the display window.

- 2 'HAND' Key
- 3 '-' Key
- 4 '+' Key

There are four operation modes onboard the Siemens PS2

- Automatic
- Manual
- Configuration (sub-routine of manual operation)
- Diagnostic

Automatic Mode

If the Siemens PS2 Positioner is mounted on a valve and is calibrated from the factory, power up the device by connecting the positive lead to of mA source the #3 terminal and negative lead to the #8 on the terminal strip. Once connected, the PS2 Positioner will start up in the *Automatic Mode*.

SIEMENS OVERVIEW FOR FACTORY MOUNTED PS2'S

Manual Mode - Overview

By pushing the 'HAND' Key once quickly, you can switch between *Auto* and *Manual Mode*. When you are in the *Manual Mode* you can stroke the valve with the '+' and '-' Keys. You can also access the *Configuration Mode* when in Manual Mode.

Configuration Mode - Overview

When in Manual Mode pushing and holding the *Hand* Key for 5 seconds accesses the *configuration mode*. There are 52 standard parameters within the *Configuration Mode* that can be changed (only 5 need to be programmed for typical set-up). Each parameter is selected by pressing the 'HAND' Key once quickly. Pressing the '+' and '-' Keys changes the parameter values.

**Refer to the Programming sheet inside the PS2 or Pages 31 - 32 for definitions and selectable choices.*

Within parameter number 4, the unit is Auto-Calibrated and initialized by pressing the '+' button and holding for 5 seconds. The unit then goes into an Auto-Calibrate sequence of 5 sub-routines. Once the Auto-Calibration is complete press the 'HAND' Key once quickly, then Exit the programming mode by pressing and holding the 'HAND' Key for 5 seconds. The positioner will then enter Manual Mode after displaying the Firmware version number. All programming changes will be stored into the RAM at this point. Then simply select the Automatic Mode by pressing the 'HAND' Key once quickly. The 4-20 mA supply will then control the valve.

**The Auto-Calibration can take up to 5-10 minutes with a large actuator. Chattering noise is normal.*

Diagnostic Mode - Overview

Diagnostic Mode can be accessed by pushing all three buttons simultaneously for 5 seconds while in the Automatic Mode. The Siemens PS2 is really still in Automatic Mode and is being controlled by the 4-20 mA signal. Scroll through this menu by pushing the 'HAND' Key once quickly. Refer to the SIPART PS2 Operation Instructions Latest Edition for all window definitions. To exit the Diagnostic Mode, press and hold the 'HAND' Key for 5 seconds, which returns the positioner back to Automatic Mode.

POSITIONER SET UP & CALIBRATION

Positioner Set Up

NOTE: Refer to the positioner information sticker to confirm that your Siemens software version and HART protocol drivers are the version required for your positioner. For more information contact Dyna-Flo Control Valves Services.

- 1 Attach positioner to actuator using mounting hardware. Refer to attached schematic. Mounting Instructions (Pages 3 to 20).
- 2 Tube up positioner.
 - a Y1 port is output to diaphragm.
 - b PZ port is supply from regulator (**Note:** positioner requires very clean dry air according to ISO/DIS 8573-1: Class 2, a better than normal filter is required, we supply a 5 micron filter in the instrument supply regulator).
 - c Use a coalescing filter if liquids are present in the supply gas.
- 3 Remove the cover and attach a mA (milliamp) source. Class I Zone II version has four screws around the outside of the cover, where Class I Zone I Explosion Proof Model has a blue end cap that unscrews from the main body. Refer to the SIPART PS2 Operation Instructions Latest Edition, for basic device wiring schematics. A wiring diagram is included under the cover of the positioner.
 - a Terminal '3' is positive.
 - b Terminal '8' is negative.
- 4 Turn on mA source (set between 4 mA – 20 mA, it does not matter).
- 5 Set Transmission Ratio Selector, ensure it is fully engaged (all the way up or down). On the Class I Zone II model, this is a square yellow vertical pin that is in the middle of the positioner body (Figure 11B). If you have the Class I Zone I explosion proof model, this is located inside the positioner in the same location, but is a yellow tab that needs to be moved with a small screw driver up or down. Refer to Figure 11B, Page 27. The sticker on the front shows the "33" and "90" position.
 - a 90 (up) position for travel more than 1-1/4" and rotary applications.
 - b 33 (down) positioner for travel 1-1/4" or less.(if you are not achieving your travel with 33 selected, change to 90)
- 6 Engage Gear Interlock. It is a 1/2" yellow selector wheel on the left side (Figure 11C). Set it to the same selection as you chose for the Transmission Ratio Selector, 90 or 33. Refer to Figure 15 & 16 on Pages 34 & 35 for further information.

POSITIONER SET UP & CALIBRATION

Positioner Set Up (Continued)

- 7 Using the '+' & '-' Keys on the positioner, stroke the valve fully to the upper & lower mechanical stops. Ensure there is no binding on the linkage and everything moves freely (must be in Manual Mode, if you are in Programming mode, press the 'HAND' Key for 5 seconds. Refer to Step 10 for more info).
- 8 **FOR LINEAR VALVES:**

Using the Sliding Clutch (Refer to Figure 15, Key 5. Class I Zone II model is on the left, Class I Zone I on the right) turn this until the position ("P" Number) display on the positioner reads between 5%-15% or 85%-95%. Then use the '+' & '-' Keys to stroke valve to the opposite mechanical stop. Check what percentage is displayed. Set this value opposite to the previous stop (e.g.: If the upper stop limit was 85%-95%, set the lower stop limit between 5%-15% or vice versa). Stroke the valve back to the opposite stop, and check what percentage is displayed again. If it is not between 85%-95% or 5%-15%, re-set the sliding clutch accordingly. Adjusting the sliding clutch will affect both mechanical stops "P" number slightly.

 - a **Note:** The objective is to achieve between 5% -15% at one stop, and 85%-95% at the other without the "P" number wrapping around at the upper or lower end of the scale. Repeat this process until both upper & lower stops read correctly. Verify by stroking to mid-travel and check if you are close to a 50% display. Once complete, leak test your tubing.
 - b **Note:** If the "P" number wraps around past 1 or 99 in either direction, the resolution of the potentiometer must be adjusted. Loosening the nut on the back side of the spring loaded button of the feedback arm assembly (Refer to Figure 11, Key A), will allow lateral movement of the button. To decrease the resolution, move towards the center of the Positioner. To increase, move towards the outer edge. Move this in small increments, as it has a significant effect on the resolution. Try ¼" movements at a time. This is a trial and error process, once you are able to stroke to both stops "P" numbers as noted above, re-tighten the nut on the back side of the spring loaded button.
 - c **Note:** If the positioner is not brand new and has already been used before, you will need to clear its "memory" for Step 8 to work correctly. The display reads 'NOINI' when it is new or has the memory cleared. If the valve moves when you adjust the Sliding Clutch, clear the memory as described in the next section.
 - d The Class I Zone II Sliding Clutch Wheel is fairly stiff and makes a ratchet noise when moved. If the Sliding Clutch refuses to move at all, refer to Step 9 and loosen the Sliding Clutch Lock. The Class I Zone I Positioner Sliding Clutch Adjustment Wheel can be rotated using a small screw driver, and is found on the output stem of the positioner (Figure 16).

POSITIONER SET UP & CALIBRATION

Positioner Set Up (Continued)

8 FOR ROTARY VALVES:

For Rotary Valve applications with 90° travel, use the '+' & '-' keys to move the valve to the mid-point of its stroke. Use the Travel Indicator of your Actuator to achieve this. Next, use the Sliding Clutch to set the Position Display of the positioner to read as close to '50' as possible, don't worry if it is out a little bit. Stroke the valve to each Travel Limit and ensure your display reads close to '0' at one limit, and close to '100' at the other. It does not matter which is open and which is closed at this point as the display can be changed to read correctly in Parameter 38. Refer to page 25, Step 12, Section "d", Note "i" of this Guide.

- 9 Once the Sliding Clutch is set, lock it by tightening the Sliding Clutch Lock with a small screwdriver. It is the yellow wheel under the Sliding Clutch. Refer to Figure 15, Page 34, rotate clockwise to lock it. Access to the Class I Zone I Clutch Lock is inside the positioner. It is a yellow wheel in the middle of the Positioner and can be adjusted by using a small screwdriver (Figure 16).

10 **Note:** The 'HAND' Key function (Figure 10)

- a One press takes you from Auto Mode to Manual Mode and Manual Mode to Auto Mode (as indicated by the display on the readout).
- b To enter Programming Mode, first make sure you are in Manual Mode then press and hold the 'HAND' Key for 5 seconds.

- 11 When in Programming Mode, scroll through the Parameters by briefly hitting the 'HAND' Key. Change the Parameter values by hitting the '+' & '-' Keys.

- 12 While in Programming Mode, change the following Parameters (refer to attached Parameter List (Figure 14) for brief explanation of parameters, refer to Chapter 9 of the SIPART PS2 Operation, chapter on Commissioning):

- a Parameter 1: **WAY**. **Note:** For LINEAR VALVES with the NEW STYLE LINEAR MOUNTING KIT (Refer to Page 8) Parameter 1 will need to be set to **FWAY**.
- b Parameter 2: 90 or 33 for Step 5.
- c Parameter 7: Set to **RISE** or **FALL** depending on your valve:
 - i **Note:** For Rotary Valves, if Potentiometer is rotating clockwise when actuator begins to stroke (increasing the signal to diaphragm), this will be **FALL**, counter clockwise: **RISE**.
 - ii For Sliding Stem with New Style mounting, **FALL** for fail closed, **RISE** for fail open.
For Sliding Stem with Old Style mounting, **RISE** for fail closed, **FALL** for fail open.

POSITIONER SET UP & CALIBRATION

Positioner Set Up (Continued)

12 (Continued)

- d Parameter 38: **RISE** or **FALL**, make it the same as Parameter 7
 - i **Note:** This parameter merely determines the display when the valve strokes (0-100%). If for some reason the display shows 100% when the valve is closed and you want it to read 0%, just change this parameter.
- e Parameter 39: **UP DO**.

13 Auto-calibrate:

- a While still in Programming Mode, scroll to Parameter 4.
 - b Hold the '+' Key down for 5 seconds.
 - c This initializes the Auto Calibration program, which sets up your VALVE AND ACTUATOR CURVE automatically.
 - d There are 5 run sequences, they switch systematically without the need for intervention. A chattering sound is normal.
 - e When the Auto-Calibration stops, the screen will indicate **FINSH**, at this time you can push the 'HAND' Key once (quickly, do not hold down), this will take you back to the program Parameters reading # 4.
 - f Hold down on the 'HAND' Key for 5 Seconds, this will store everything to Memory and will take you back into Manual Mode.
- 14 Press the 'HAND' Key and this returns the positioner into the AUTO Mode, which will then respond to your controller's output signal (or the mA source you have connected). Stroke the valve with your mA source to ensure linearity (e.g. check valve stroke at 0%, 25%, 50% etc.).
- 15 Fine-tuning and customizing of programming can be further accomplished, please consult the SIPART PS2 Operation Instructions for the instructions and procedures on (programming/customizing) your positioner for each application.

Clearing the memory

To restore the positioner to factory "out of box" default settings refer to Parameter 50. PRST (Pages 25 & 26) for reset options (option '**ALL**' will completely reset the positioner to factory default settings).

- 1 In Programming Mode, scroll to parameter 50.
- 2 Use the '-' & '+' Keys to scroll to the reset option required. Reset options are listed on Page 30.
- 3 Press and hold the '+' Key on the desired reset option, the word **Strt** will be displayed for several seconds.
- 4 When cleared the word **oCay** will be displayed. Let go of '+' Key.
- 5 The selected parameters will now have been reset to factory defaults.

OPERATIONS & CONFIGURATIONS

Figure 11 Adjustment Nut

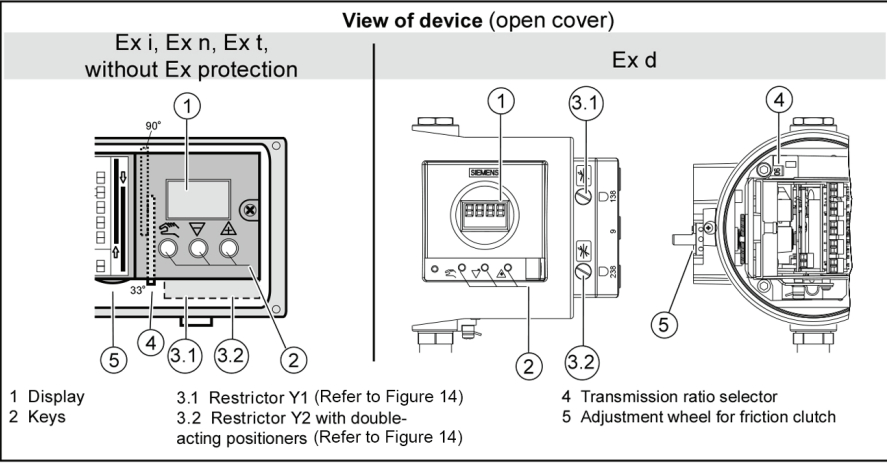
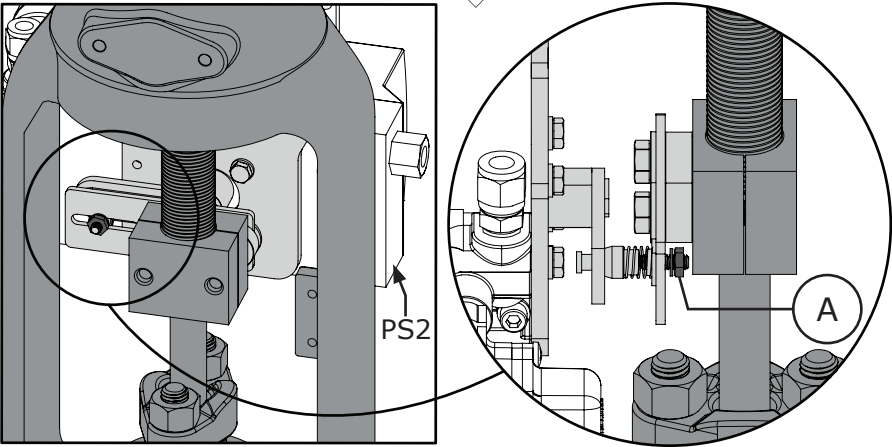
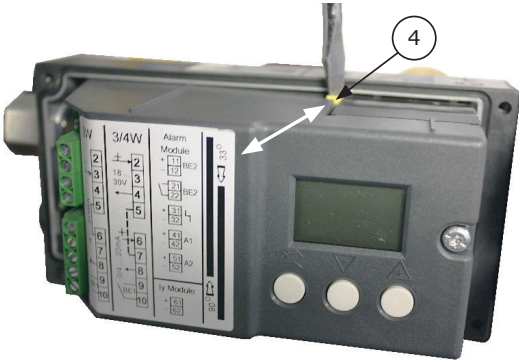


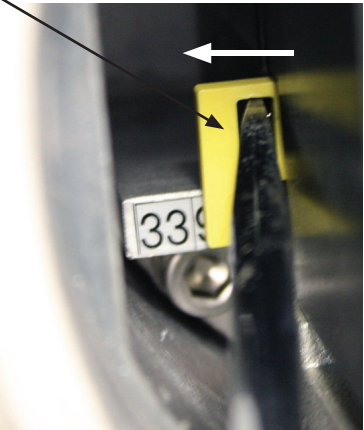
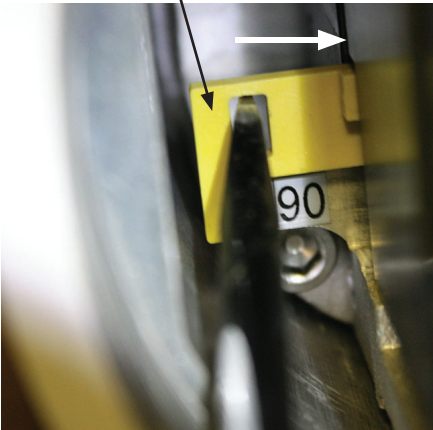
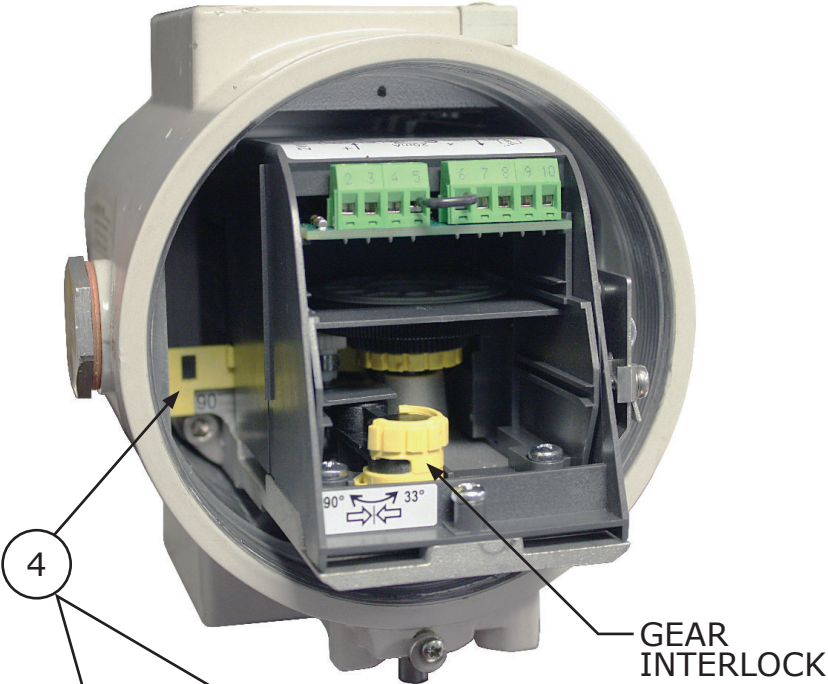
Figure 11A
*Transmission
Ratio Selector Detail*

Figure 11B
*Standard Housing
Ratio Selector*



OPERATIONS & CONFIGURATIONS

Figure 11C *Explosion Proof Housing Ratio Selector*



OPERATIONS & CONFIGURATIONS

Figure 12 *Changing the Input Level*

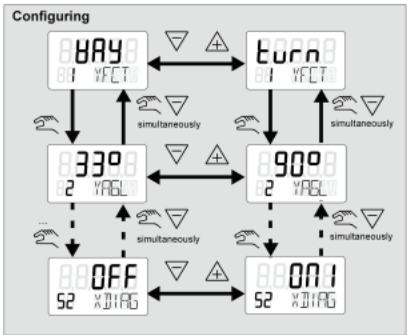
Changing the input level

Mode	Display (1)
P manual mode Change position using: ▽ ▲	Position of potentiometer [%] Not initialized PRST > 5 s
Configure Change parameter name using: or + ▽ Change value using: ▽ ▲	Parameter value Parameter number Parameter name > 5 s > 5 s
Manual mode Change position using: ▽ ▲	Position [%] Error code Mode and setpoint [%] > 5 s > 5 s > 2 s
Automatic mode	Position [%] Error code Mode and setpoint [%] 1x 1x
Diagnostics	Diagnostics value Diagnostics number Diagnostics name > 2 s > 2 s

* Excerpt from Leaflet "Operation - a concise overview" A5E34928958-01

OPERATIONS & CONFIGURATIONS

Figure 13 Changing the Input Level Continued



Automatic Initialization (starting with factory setting)
Condition: Transmission ratio selector (4) is set accordingly
(see figure "View of device")

Step	Meaning
1.) Part-turn actuator Linear actuator	
2.)	Press for > 5 s Remaining steps carried out automatically.
3.)	Direction of action is determined.
4.)	Checking of travel and adjustment of zero and stroke (from stop to stop).
5.)	Determination and display of positioning time down (dxx.x), up (uxx.x) Stop with:
6.)	Determination of minimum increment length.
7.)	Optimization of transient response.
8.)	Initialization terminated successfully. (travel in mm for linear actuators) (angle of rotation for part-turn actuators) Continue using:

Possible messages		
Display	Meaning	Measures
 	Actuator does not move.	Acknowledge message using: Check restrictor (3) and open if necessary. Drive actuator to working range using: Restart initialization.
	Tolerance band "Down" violated.	Change gearing (4). Continue using: or adjust friction clutch (5) up to display: Continue using: or for "WAY" using:
	Once the friction clutch (5) has been adjusted.	For linear actuators: Set pick-up lever perpendicular to the spindle: Continue using:
	Tolerance band "Up" violated.	Acknowledge message using: Set the next highest travel value on the lever. Restart initialization. Additional feature for part-turn actuators: Adjust tolerance band using: up to display:
	Span "Up-Down" insufficient.	Acknowledge message using: Set the next lowest travel value on the lever. Restart initialization.
 	Actuator does not move. Positioning time is possible to adjust.	Adjust positioning time using restrictor(s) (3). Continue using: or using:
See Operating Instructions for further messages		

(The gray values in the top line of the digital display are examples)

* Excerpt from Leaflet "Operation - a concise overview" A5E34928958-01

PARAMETERS CHART

Figure 14 Parameters Chart Example

SIEMENS PS2 PARAMETERS CHART

Parameter name	Function	Parameter values (bold = factory setting)	Unit	Notes
1.YFCT	Type of actuator	Normal Inverted part-turn actuator turn -turn linear actuator WAY -WAY linear actuator without sine LWAY -LWAY correction ncSt -ncSL part-turn actuator with NCS ncSt -ncSL linear actuator with NCS ncSL -ncSL linear actuator with NCS and lever ncSL -ncLL		
2.YAGL	Rated angle of rotation of positioner shaft Set transmission ratio selector (4) appropriately (see view of device)	33° 80°	Degrees	
3.YWAY	Range of stroke (optional setting). If used, the value on the actuator must correspond to the set range of stroke on the lever arm. Carrier pin must be set to the value of the actuator travel or, if this value is not scaled, to the next larger scale value	OFF 5 10 15 20 (short lever 33°) 25 30 35 (short lever 90°) 40 50 60 70 90 110 130 (long lever 90°)	mm	
4.INITA	Initialization (automatically)	NOINI no / ## # Srt		
5.INITM	Initialization (manually)	NOINI no / ## # Srt		
6.SCUR	Current range of setpoint	0 ... 20 mA 4 ... 20 mA		
7.SDIR	Setpoint direction	Rising Falling		
8.SPRA	Setpoint split range start	0.0 ... 100.0	%	
9.SPRE	Setpoint split range end	0.0 ... 100.0	%	
10.TSUP	Setpoint ramp UP	Auto / 0 ... 400	s	
11.TSDO	Setpoint ramp DOWN	0 ... 400	s	
12.SFCT	Setpoint function Linear Equal percentage 1: 25, 1:33, 1:50 Invers equal percentage 25:1, 33:1, 50:1 Freely adjustable	Lin 1 - 25 1 - 33 1 - 50 n1 - 25 n1 - 33 n1 - 50 FREE		
13.SL0 2) etc. ... 33.SL20	Setpoint turning point at	0 % etc. to 100 %	%	
34.DEBE	Deadband of closed-loop controller	Auto / 0.1 ... 10.0	%	
35.YE	Start of manipulated variable limit	0.0 ... 100.0	%	
36.YA	End of manipulated variable limit	0.0 ... 100.0	%	
37.YNRM	Standardization of manipulated variable On flow Rising Falling	MPOS Flow rise FALL		
38.YDIR	Direction of manipulated variable for display and position feedback			

PARAMETERS CHART

J1, 1TMAX ⁽⁵⁾	Monitoring the upper limit temperature with the following parameters: Temperature unit Threshold 1 Threshold 2 Threshold 3	°C / °F -40 ... 75 ... 80 / -40 ... 184 -40 ... 80 ... 80 / -40 ... 184 -40 ... 90 / -40 ... 194
L1, 1STRK ⁽⁵⁾	Monitoring the number of total strokes with the following parameters: Limit of strokes Factor 1 Factor 2 Factor 3	1 ... 1E6 ... 1E8 0.1 ... 1.0 ... 40.0 0.1 ... 2.0 ... 40.0 0.1 ... 5.0 ... 40.0
Q1, 1DCHG ⁽⁵⁾	Monitoring the no. of changes in direction with the following parameters: Limit for number of changes in direction	1 ... 1E6 ... 1E8
O1, LIMIT		
O2, FACT1	Factor 1	0.1 ... 1.0 ... 40.0
O3, FACT2	Factor 2	0.1 ... 2.0 ... 40.0
O4, FACT3	Factor 3	0.1 ... 5.0 ... 40.0
P1, 1PAVG ⁽⁵⁾	Monitoring the position average value with the following parameters: Time basis for average value generation	0.5h / 8h / 5d / 60d / 2.5y
P1, TBASE		
P2, STATE	Status of monitoring position average value	Idle / REF / ## # / Stt
P3, LEVL1	Threshold 1	0.1 ... 2.0 ... 100.0
P4, LEVL2	Threshold 2	0.1 ... 5.0 ... 100.0
P5, LEVL3	Threshold 3	0.1 ... 10.0 ... 100.0

HINTS:

- Parameter only appears with "WAY", "WAY", "ncSL", and "ncLL".
- Turning points only appear with selection 12, SFCT = "FREE".
- NC contact means: action with opened switch or Low level
NO contact means: action with closed switch or High level
- Normal means: High level without fault
Inverted means: Low level without fault
- Parameters A up to P appears only if parameter 52, XDIAG is activated with On1, On2 or On3.
The contents of the parameters A up to P appears also only if the selected parameter is activated with On.

A5E34928958-01

* Excerpt from Leaflet "Operation - a concise overview" A5E34928958-01

38, YCLS	Tight closing with manipulated variable	None Up only Down only Up and down	NO up do up2 do	0.0 ... 0.5 ... 100.0 0.0 ... 95.5 ... 100.0	% %
40, YCDO	Lower value for light closing				
41, YCUP	Upper value for light closing				
42, BIN1 ⁽³⁾	Function of binary input 1	None Only message Block configuration Block configuration and manual Drive valve to position YE Drive valve to position VA Block movement Partial stroke test	NO contact NC contact	OFF on bl oc 1 bl oc 2 up doWn Stop PSI	% %
43, BIN2 ⁽³⁾	Function of binary input 2	None Only message Drive valve to position YE Drive valve to position VA Block movement Partial stroke test	NO contact NC contact	OFF on up doWn Stop PSI	% %
44, AFC1 ⁽⁴⁾	Alarm function	None A1=Min, A2=Max A1=Min, A2=Min A1=Max, A2=Max	OFF on up doWn Stop PSI	0.0 ... 10.0 ... 100.0 0.0 ... 90.0 ... 100.0	% %
45, A1	Response threshold of alarm 1				
46, A2	Response threshold of alarm 2				
47, 1FCT	Function fault message output	On fault Fault + not automatic Fault + not automatic + BIN (* means logical OR operation)	Normal Inverted	Auto / 0 ... 100 Auto / 0 ... 100	s %
48, 1TIM	Monitoring time for fault message "control deviation"				
49, 1LIM	Response threshold for fault message "control deviation"				
50, PRST	Reset all parameters which can be reset by "init", "PvA" and "qAg". Reset initialization parameters 1 YFCT to 5 INITM.				
51, PNEUM	Fail in place	Standard pneumatic block Fail in place pneumatic block			
52, XDIAG	Activating for extended diagnostics	Off Single-stage alarm Two-stage alarm Three-stage alarm			

FUNCTIONAL UPGRADE

SIEMENS

A5E00201583-02

Functional Upgrade of the SIPART PS2 Electropneumatic Positioner

Dear Customer,

As you may already be aware, the SIPART PS2 Electropneumatic Positioner has a Sliding Clutch and a switchable Transmission and so can be used universally on Part-Turn and Linear actuators. This means that the Zero Point on Part-Turn actuators is not an important consideration, nor is a symmetrical mounting necessary on linear actuators, as the working range of the positioner can be adjusted at any time with the help of the Sliding Clutch. The switchable Transmission also enables you to adjust the positioner to smaller or larger strokes.

Every now and then in the harsh conditions of the process industry the SIPART PS2 is exposed to extreme acceleration of the valve position (for example when a wrongly applied or open valve is upstream in the process or from steam pockets) which exceed the specified load limits of the PS2. This could result in an unwanted adjustment of the Sliding Clutch or mis-detection of the Gear Ratio position.

For this reason the SIPART PS2 positioner is now equipped with a locking mechanism for the sliding clutch as standard. You are also now able to lock the Gear Ratio switch to prevent mis-detection of the position as detailed above.

Both of these locking options are labeled via additional tags inside the device as detailed in Figures 15 & 16. Please note that these locks are only required if extreme acceleration (as in the above examples) or strong vibration might be present within your process.

Procedure

After Mounting and Start Up (including setup) of the PS2 the Sliding Clutch torque (Figures 15 & 16) can be set as follows:

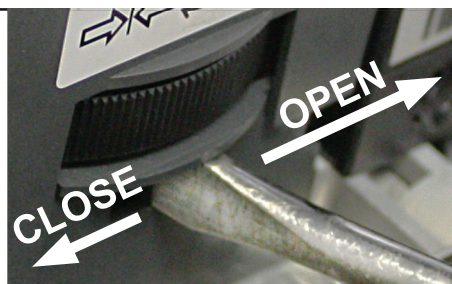
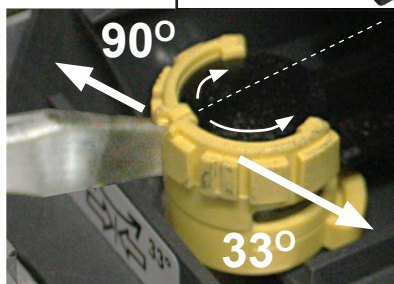
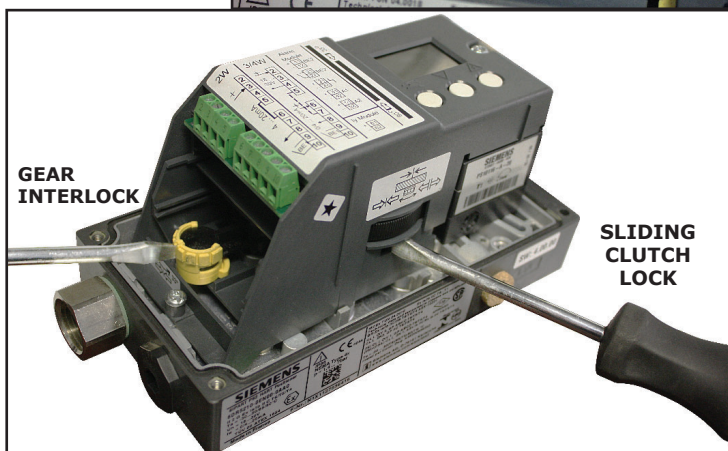
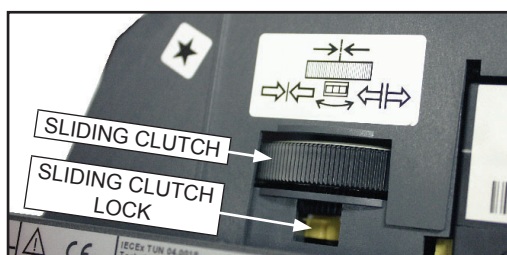
- Stick a conventional flat headed screwdriver (approx. 4mm wide) into one of the slots on the yellow wheel within the unit (Sliding Clutch Lock).
- Turn the yellow wheel to the left with the screwdriver until you hear it "snap" in. This increases the torque of the Sliding Clutch.
- When the Sliding Clutch is locked into place there should be a gap of approximately 1mm between the yellow and black wheels within the unit.
- If you have to make a Zero Point Setting, e.g. after changing the drive, the torque on the sliding clutch must first be reduced by turning the yellow wheel (Sliding Clutch Lock) as far to the right as it will go. After setting the Zero Point, you can lock the Sliding Clutch as described above.

FUNCTIONAL UPGRADE

To lock the Gear Ratio (Transmission), take the unit as factory set and do as follows:

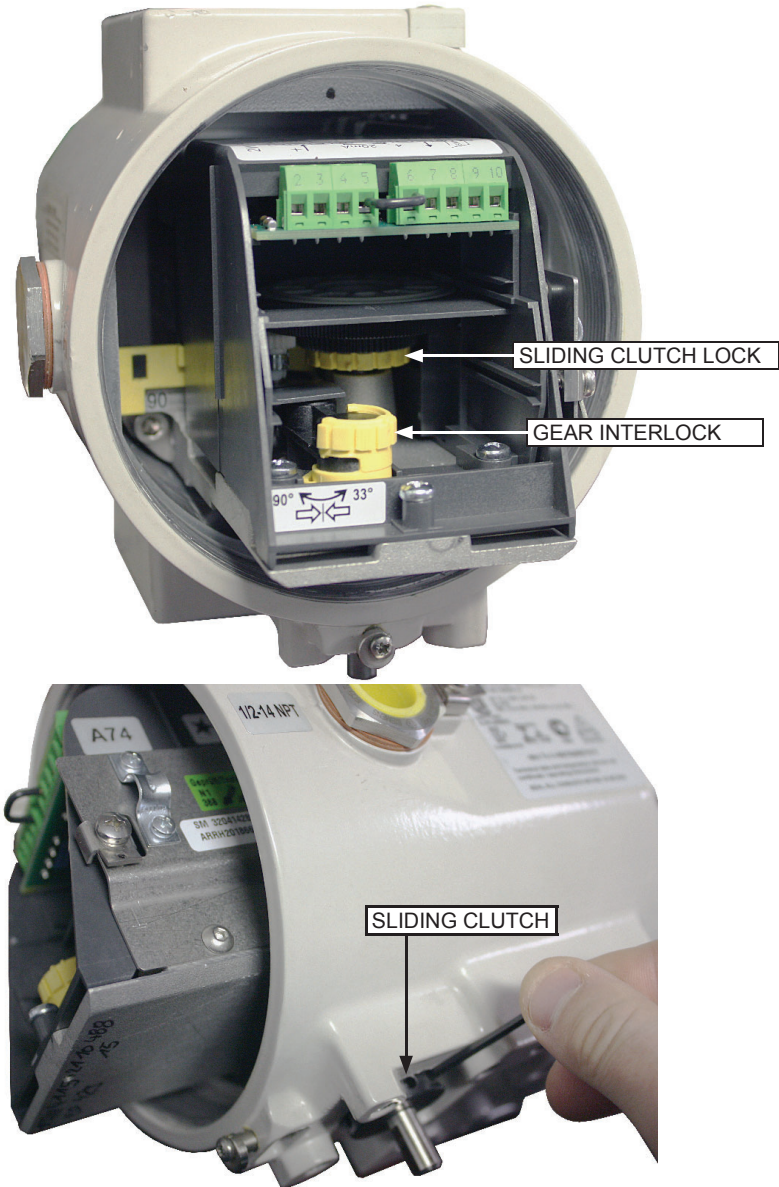
- Using a conventional flat headed screwdriver (approx. 4mm wide) turn the yellow wheel of the Gear Interlock to the left or right according to your chosen setting (either 33° or 90°) until it noticeably locks in place. Refer to Figures 15 & 16.
- In order to set the Gear Ratio (Key 4, Figure 8A) any locks in place must first be released. Hence the yellow wheel of the gear interlock must first be put into the neutral position in order to reset the Gear Ratio if necessary, e.g. after replacing the actuator. (Refer to the SIPART PS2 Operation Instructions Latest Edition)

Figure 15
Standard Housing
Gear Ratio Adjusting



FUNCTIONAL UPGRADE

Figure 16 *Explosion Proof Housing Gear Ratio Adjusting*



FAQ / TROUBLESHOOTING AND SOLUTIONS

The most common cause of Failure is a contaminated air supply. Very clean, dry air is required according to ISO/DIS 8573-1: Class 2.

1 If the valve is not actuating properly...

- Ensure that you have an adequate gas supply pressure to the positioner, look at the supply pressure gauge and also look at the actuator tag for maximum allowable pressure or bench set range.
- Check source to ensure that you have power and 4-20 mA available.
- See if the display window on the PS2 is illuminated. If it is not then the power supply is down or you have lost your 4-20 mA signal.
- If you have both of the above, then switch the unit to manual and see if the valve will stroke by using the *Increase (+)* and *Decrease (-)* Keys to open and close the valve.
- Check for error code messages on the bottom left hand side of the display window and consult the manual for code meaning.

2 If PS2 Positioner is hunting...

- Check the signal into the PS2 for *interference signal*, this could be due to improper type of wiring.
- Check the 4-20 mA supply signal source, as it may be fluctuating.
- Check tubing connections after positioner for leaks by performing a *detection test with liquid leak detection solution*. The actuator may also be leaking. Or there may be a loose tube connection.

3 If Positioner does not move valve in either Manual or Auto Mode

- Check the gas supply lines for correct pressure to move valve and actuator.
- Check the regulator for signs of moisture.
- Check inlet filters under gauge block on PS2 for plugging.

4 If the PS2 Positioner is constantly venting...

- *Peizo block* has been contaminated with water or particulate.
- Upper display window shows --- which indicates a flat spot or no signal out of PS2 potentiometer.

5 There is a 4-20 mA input to positioner and correct voltage, but no display and the PS2 will not respond in manual or automatic mode...

- Replace the *motherboard* or with a new PS2 Positioner.
- Unit may also have been flooded with liquids.

FAQ / TROUBLESHOOTING AND SOLUTIONS

6 Valve is opening instead of closing or vice versa...

- Change direction in programming Parameter #7 to **RISE** or **FALL** to whichever is required.

7 If power is interrupted and the connection between the PS2 is broken...

- The PS2 Positioner will vent all gas inside the actuator on the single acting Positioner.
- A double acting PS2 Positioner will vent what ever is up stream of port Y2 and supply full regulator set pressure to Y1, closing or opening the valve.
- When power is restored and you have *4-20 mA*, the unit will power up and go directly into the *Automatic Mode*. There is no need for reprogramming the PS2 Positioner.

8 Positioner goes past 0% or past the closed to a negative value...

- Sign of over travel. This could be due to worn trim.
- Improper calibration - re-calibrate.

9 Valve doesn't fully open or close...

- Check to see gearing has not been changed either in the Program parameters or on the physical selection switch.
- Check connections for loose hardware. This causes dead band.
- Check for proper air supply pressure.
- Improper calibration - re-calibrate.
- Valve is plugged with material.

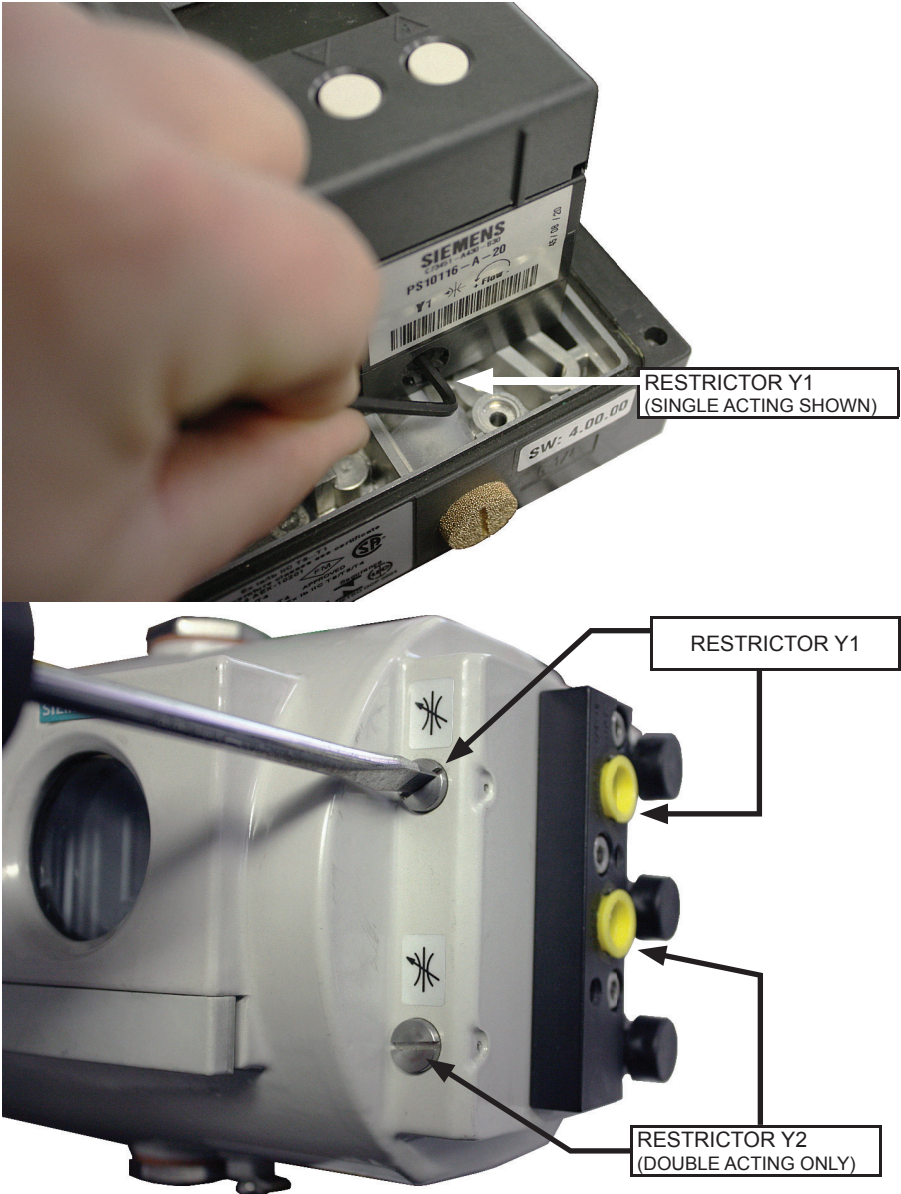
10 Valve actuates too quickly...

- Set restrictor valve to slow down pneumatically (Refer to Figure 17).
- Set ramp up and ramp down time accordingly, in the programming parameter numbers 10 and 11.

** Consult the Programming parameter chart on Pages 31 & 32 to choose time increments accordingly.*

FAQ / TROUBLESHOOTING AND SOLUTIONS

Figure 17 Restrictor Valve Adjustment Detail



SIEMENS PS2 QUICK START

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